

SECTION 05310

STEEL DECK

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Roof deck.
- B. Supplementary framing for openings as detailed on the plans.
- C. Bearing plates and angles.

1.02 RELATED REQUIREMENTS

- A. Section 01400 - Quality Services.
- B. Section 05120 - Structural Steel.
- C. Section 05500 - Metal Fabrications.

1.03 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2008.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2010.
- C. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; 2010.
- D. AWS D1.3 - Structural Welding Code - Sheet Steel; American Welding Society; 2008.
- E. AWS A2.0 - Welding Symbols
- F. American Institute of Steel Construction (AISC); Specification for Design, Fabrication, and erection of Structural Steel for Buildings.
- G. AISI-NAS - American Iron and Steel Institute - North American Specification, current edition.
- H. SDI (DM) - Publication No.31, Design Manual for Composite Decks, Form Decks, Roof Decks; Steel Deck Institute; 2007.
- I. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); The Society for Protective Coatings; 2002 (Ed. 2004).
- J. SSPC-Paint 25 - Zinc Oxide, Alkyd, Linseed Oil Primer for Use Over Hand Cleaned Steel, Type I and Type II; Society for Protective Coatings; 1997 (Ed. 2004).
- K. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.
- L. California Code of Regulations (CCR); Title 24, California Building Code (CBC), Chapter 22A - Steel.
- M. International Conference of Building Officials (ICBO); UBC, latest edition.

1.04 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittals procedures.
- B. Shop Drawings: Indicate deck plan, support locations, projections, openings, reinforcement, pertinent details, and accessories. Indicate welds in accordance with AWS A2.0.
- C. Product Data: Provide deck profile characteristics, dimensions, structural properties, and finishes.
- D. Where shop drawings of supporting members are required, deck shop drawings shall be

prepared from reviewed shop drawings of the supporting members.

- E. Test Reports: Submit certified laboratory test reports confirming physical characteristics of materials used in the performance of the work of this section. Where tests will be conducted outside the State of California, the Contractor shall pay for travel, lodging, testing hours, etc., for the testing laboratory field inspector(s) for the length of testing and also additional testing which failed.
- F. Certification: Submit manufacturer's calculations and supporting data, stating that each metal decking proposed for use complies with the Contract Documents and applicable code requirements. Obtain Architect's review prior to fabrication and installation of metal decking.
- G. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.05 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Testing and Inspections: Where required by CBC Section 1704A, provide testing and inspections by a Special Inspector.
 - 2. Fire rating: Be responsible for obtaining UL and Division of State Architect (DSA) approval of the decking, when used as part of the assembly indicated on Drawings in which fire-resistant construction ratings are required.
 - 3. Welding inspection shall conform to Section 2204A.1.
- B. Design deck layout, spans, fastening, and joints under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of California.
- C. Source Quality Control:
 - 1. Steel deck diaphragms shall comply with CBC Sections 2209A.3 and 1604A.
- D. Installer Qualifications: Company specializing in performing the work of this Section with minimum three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Cut plastic wrap to encourage ventilation.
- B. Separate sheets and store deck on dry wood sleepers; slope for positive drainage.
- C. Steel shall be protected from corrosion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Steel Deck: $f_y = 38,000$ p.s.i. minimum
 - 1. Verco "H.S.B.-36".
 - 2. Canam Steel Corporation; Product - Type 'B'.
 - 3. ASC Steel Deck; Product - B-36.
 - 4. Substitutions: See Section 01600 - Product Requirements.

2.02 STEEL DECK

- A. All Deck Types: Select and design metal deck in accordance with SDI Design Manual.
 - 1. Calculate to structural working stress design and structural properties specified.
- B. Roof Deck: Non-composite type, fluted steel sheet:
 - 1. Galvanized Steel Sheet: ASTM A 653, Structural Steel (SS) Grade 33/230, with G90/Z275 galvanized coating.
 - 2. Minimum structural properties per foot of width:
 - a. Section modulus: 0.321 in³.

- b. Moment of Inertia: 0.302 in⁴
- 3. Minimum Metal Thickness, Excluding Finish: 16 gage.
- 4. Nominal Height: 1-1/2 inch (38 mm).

2.03 ACCESSORY MATERIALS

- A. Bearing Plates and Angles: ASTM A36/A36M steel, unfinished.
- B. Welding Materials: AWS D1.1.
- C. Fasteners: Galvanized hardened steel, self tapping.
- D. Weld Washers: Mild steel, uncoated, 3/4 inch (19 mm) outside diameter, 1/8 inch (3 mm) thick.
- E. Shop and Touch-Up Primer: SSPC-Paint 25, zinc oxide, complying with VOC limitations of authorities having jurisdiction.
- F. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, complying with VOC limitations of authorities having jurisdiction.

2.04 FABRICATED DECK ACCESSORIES

- A. Sheet Metal Deck Accessories: Metal closure strips and cover plates, 22 gage (0.8 mm) thick sheet steel; of profile and size as indicated; finished same as deck.

2.05 FABRICATION

- A. Fabricate steel decking in accordance with the AISC Specification and CBC Section 2209A.3.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions prior to beginning work.

3.02 INSTALLATION

- A. Erect metal deck in accordance with SDI Design Manual and manufacturer's instructions. Align and level.
- B. On concrete and masonry surfaces provide minimum 4 inch (100 mm) bearing.
- C. On steel supports provide minimum 1-1/2 inch (38 mm) bearing.
- D. Place metal decking on the supporting steel framework with staggered end joints and adjust to final position before permanently fastening in place.
 - 1. Each unit shall be brought to proper bearing on the supporting members.
 - 2. Place the units in straight alignment for entire length of run of cells and with close registration of the cells of one unit with those of abutting unit.
 - 3. Steel deck shall be continuous for three spans (four supports).
- E. Fasten decking to the steel framework at end of units and at intermediate supports. Welding shall comply with AWS D1.3 requirements.
- F. Welding to be performed by licensed light gage welder, use E60 or E70 electrode.
- G. Fasten the side laps between supports as designated on the Structural Drawings.
- H. Perform all field cutting parallel with the cells in the area between the cells taking care to leave sufficient horizontal material to permit satisfactory welding to the supporting steel.
- I. Accessories:
 - 1. At openings between deck and walls, columns, and openings, provide all flashings, metal closure pieces, transition pieces, reinforcement, and accessories attached to the decks as may be required and as shown on Drawings, to make decking installation complete.

- J. Where deck changes direction, install 6 inch (150 mm) minimum wide sheet steel cover plates, of same thickness as deck. Fusion weld 12 inches (300 mm) on center maximum.
- K. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up primer.

3.03 FIELD QUALITY CONTROL

- A. Tests and Inspections:
 - 1. Inspection: According to Reference Standards and AWS Welding Inspection. The Inspector visually inspect welds, shall be present to inspect and approve groove, multi-pass, and penetration welding, shall inspect high-strength bolting performed in fabricator's shop or at the site, and shall inspect all erection.
 - 2. Tests of Welding and Bolting: Testing Laboratory shall inspect field welding and high-strength bolting in conformance with requirements of Code, and certify in writing, after completion of the work, that welding and high-strength bolting have been performed in accordance with the Drawings, Specifications, and Code.
 - 3. Inspection of High-Strength Bolts: The Testing Laboratory shall check the bolt tightness of a minimum 10 percent of bolts, selected at random, for each high-strength bolted joint. Inspection procedure shall conform to the Reference Specification.
 - 4. Inspection of Welds: Testing Laboratory shall inspect groove and full penetration welded connections by ultrasonic or other approved non-destructive tests.
- B. Ultrasonic testing shall be performed by a specially trained and qualified technician who shall operate the equipment, examine welds, and maintain a record of welds examined, defects found, and disposition of each defect. All defective welds shall be repaired and costs for retesting defective welds shall be reimbursed by the Contractor.
- C. Rate of Testing: Initially, all welds requiring ultrasonic testing shall be tested at a 100 percent rate to establish the qualifications of each individual welder. The frequency of testing may be reduced to 25 percent rate if rejectable defects occur in less than five percent of tested welds. If the rate of rejectable defect increases to five percent or more, 100 percent testing shall be performed until the defect rate is reduced to less than five percent. The percentage shall be calculated for each welder independently.
- D. Backing Strips: Contractor shall remove backing strips whenever ultrasonic indications arising from weld roots can be interpreted as either a weld defect or the backing strip and, if no root defect is visible, weld shall be retested. If no defect is indicated on this retest, and no significant amount of the base and weld metal have been removed, the joint needs no further repair or welding. If a defect is indicated, it shall be repaired. Contractor shall bear the cost of removals.
- E. Questionable root indications that prove not to be defective welds shall not count against the welder to increase the test rate.
- F. Ultrasonic Instrumentation shall be calibrated by technician to evaluate the quality of the weld in accordance with AWS D1.1, Sections 5 and 6.

3.04 ADJUSTING AND CLEANING

- A. Field Touch-up Painting: After the erection of structural steel, touch-up paint field connections and abrasions in the shop paint coating with the same paint used for the shop painting.
- B. After erection and field welding, wire brush scarred galvanized surfaces and give field touch-up of American Solder and Flux Co. "Drygalv", or Metalalloy Products Co. "Galvalloy" applied according to manufacturer specifications.

END OF SECTION